

REMARKS

This application contains claims 51-58. Claim 52 has been canceled without prejudice. Claims 51, 53 and 55-57 are hereby amended. Claim 58 is new. No new matter has been introduced. Reconsideration is respectfully requested.

In the Official Action, claim 57 was objected to for reciting "azimouth" instead of "azimuth." Applicant has corrected this typographical error and requests that the objection be withdrawn.

Claim 56 was rejected under 35 U.S.C. 112, second paragraph. The Examiner asserted that the term "electronic components arranged to apply phase shifting, amplification and combining to the RF signals" is indefinite. Applicant has amended claim 56 to recite explicitly that phase shifting is performed by one or more phase shifters, amplification is performed by one or more amplifiers, and combining is performed by one or more combiners. Support for these specific types of electronic components and their functions can be found, for example, in paragraphs [0073]-[0074], [0080] of the specification. (Paragraph numbers refer to the published version of the application, U.S. 2008/0129624.) Applicant believes that amended claim 56 meets the requirements of 35 U.S.C. 112, and requests that the rejection be withdrawn.

Claims 51-52, 54 and 56 were rejected under 35 U.S.C. 102(b) over Mast et al. (U.S. 6,166,705, hereinafter Mast). While disagreeing with the grounds of rejection, Applicant has amended independent claim 51 in order to sharpen the distinction of the present invention over the cited art. Claims 53, 55 and 57 have been amended for proper antecedence from amended claim 51. Claim 52 has been canceled.

Claim 51, as amended, recites an antenna system including at least two multi-layer Printed Circuit Boards (PCBs). A first multi-layer PCB has multiple antenna elements disposed thereon. A second multi-layer PCB is mounted below the first multi-layer PCB, and includes electronic components for processing Radio Frequency (RF) signals received by the antenna elements of the first multi-layer PCB. The multi-layer PCBs are interconnected by multiple RF transitions that transfer the RF signals from the first multi-layer PCB for processing by the electronic components in the second multi-layer PCB. The amendment of claim 51 essentially incorporates the limitations of claim 52, now canceled, into the independent claim.

The cited art does not teach or suggest the elements of amended claim 51. Mast describes a phased-array antenna made of a grid of tiles. In rejecting dependent claim 52, on page 4 of the Official Action, the Examiner cited Figs. 6 and 7 and column 4 of Mast as allegedly teaching that the multi-layer structures used in the antenna system comprise multi-layer PCBs. The cited figures and text, however, clearly show only a single multi-layer printed wiring board (element 70 in Fig. 6 or element 80 in Fig. 7). Mast's multi-layer wiring board is not mounted below or above any other multi-layer wiring board, and is certainly not connected to another multi-layer wiring board using RF transitions, as recited in amended claim 51.

In the antenna configuration shown in Mast's Fig. 6, a single multi-layer printed wiring board (70) is connected to an antenna element (30) using a conductive pin (33) that passes through a metallic support layer (60) - see Fig. 6 and column 4, lines 28-34. Layer 60 is also referred to as a "metallic structural layer" in Fig. 6.

The term "multi-layer PCB" is a term of art having a clear, well-known meaning. Mast's elements 30 and 60 cannot be taken in any way, alone or in combination, to be a kind of multi-layer PCB.

In the antenna configuration shown in Mast's Fig. 7, an antenna element (30) is mounted on one face of a single multi-layer printed wiring board (80), and circuit devices (45) are mounted on the opposite face of this board. The antenna element is connected to the devices using plated through holes (85) - see Fig. 7 and column 5, lines 11-21.

None of Mast's antenna configurations includes two or more multi-layer PCBs that are mounted one below the other and connected by RF transitions, as recited in amended claim 51. Claim 51, as amended, is therefore patentable over the cited art. Claims 54 and 56 depend from claim 51. In view of the patentability of claim 51, these dependent claims are believed to be patentable, as well.

Claims 53 and 57 were rejected under 35 U.S.C. 103(a) over Mast in view of Part et al. (U.S. patent 6,191,734, hereinafter Part) or Karlsson et al. (U.S. Patent 6,034,634, hereinafter Karlsson) or Grinberg et al. (U.S. Patent 5,929,819, hereinafter Grinberg). Claim 55 was rejected under 35 U.S.C. 103(a) over Mast in view of Pett et al. (U.S. patent 5,210,542, hereinafter Pett). Claims 53, 55 and 57 depend from amended independent claim 51. None of the additional cited references, alone or in combination, teaches or suggests the use of two or more multi-layer PCBs that are mounted one below the other and connected by RF transitions, as recited in amended claim 51. In view of the patentability of claim 51 over Mast, claims 53, 55 and 57 are patentable over Mast in view of Part, Karlsson, Grinberg or Pett.

New claim 58 recites that the second multi-layer PCB has a top surface facing the first multi-layer PCB, and

that at least one of the electronic components is disposed on the top surface of the second multi-layer PCB (i.e., between the two multi-layer PCBs). This feature is clearly shown in Fig. 1 of this application (first multi-layer PCB 3, second multi-layer PCB 15, and electronic components 14 on the top surface of PCB 15) and in paragraph [0073]. The feature of mounting electronic components between the stacked multi-layer PCBs is not taught or suggested by the cited art.

Applicant believes the amendments and remarks presented hereinabove to be fully responsive to all of the objections and grounds of rejection raised by the Examiner. In view of these amendments and remarks, Applicant respectfully submits that all of the claims in the present application are in order for allowance. Notice to this effect is hereby requested.

Respectfully submitted,  
/DANIEL KLIGLER/  
Daniel Kligler, Reg. No. 41,120  
D. Kligler IP Services Ltd.  
P.O. Box 33111, Tel Aviv 61330  
Tel. 011-972-54-6968891  
Fax 011-972-3-6935321  
daniel@dkpat.co.il